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Get more from your supplies dollar. (streamlining supplies operation)
(Tutorial)

Fernberg, Patricia M.
Modern Office Technology, v37, n8, p46(2)
August, 1992

DOCUMENT TYPE: Tutorial ISSN: 0746-3839 LANGUAGE: ENGLISH
RECORD TYPE: FULLTEXT; ABSTRACT
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ABSTRACT: The key to making the most out of the supplies budget is to buy better. Basing purchases on just the price may not lead to savings. Cutting costs means maintaining a zero inventory, buying standardized products, streamlining the order process and reducing flaws in the system. Defining the best method for managing the purchasing process involves several steps. The first is to define the ordering method; stockless supplies programs can be implemented through a computerized system, wherein the supplies order is transmitted to the dealer via electronic data interchange (EDI), or through the telephone. Both these methods cut costs by eliminating the need for a central warehouse and a supply space, reducing overspending and waste, and discouraging pilfering.

TEXT:

If price determines your purchases of office supplies, you could be losing money with every order. Here's some advice to help streamline your supplies operation and pare your costs.

Containing some costs of doing business can be fairly simple: flying coach instead of first-class, cancelling the company picnic, and postponing equipment purchases. Other costs seem impossible to contain: supplies, for example, are indispensable to the daily operation in the office. You really cannot cut out purchases of pens, paperclips, or lightbulbs. Besides, you're getting the best price.

Or are you? According to George Tice, a long-time expert in the office supplies industry and president of Express Office Products in Atlanta, GA, those who base purchases on price alone are missing out on savings. "The price of a product is what most people historically look at when we buy. For instance, when you buy a car, you go from dealer to dealer to get the best price. Purchasing departments always have done this," he says. "But around 1980, the cost of running the office became half of the cost of the American business. For example, it cost a shoe-making business as much to keep records as it did to make shoes. That's when people started to focus on buying better."

He points to a 1980 study of the day-to-day costs involved in operating a business. "Environmental costs, such as rent, light, and heat, account for two percent of the cost; office supplies from paperclips to copiers is six percent. The other 92 percent of the cost of the office was the people working in the office," he reports. "If you were trying to control supplies costs, you could only control that six percent. If you wanted to save 50 percent of that cost, you'd only save your company three percent. But if you focused on that ninety-two percent, you could find ways to outsource some of the efforts you're using and really attack the total cost. If I could cut my people costs by just 10 percent, I could save more in dollars -- 9.2 percent -- than in all the purchases of supplies. The cost of people is what needs to be addressed and that's what you have to focus on controlling."

To cut those costs, it's important to assess how your company's purchasing program works. Tice notes that the average purchase order costs more than \$70 to issue, and those costs are completely tied to the process of issuing the purchase order: printing and distributing requisition forms, the time required to fill out the form and submit it for approval, the time involved in reviewing, justifying, and approving the purchase order,

forwarding it to purchasing, time involved in capturing the data on the order and placing the order, and the like. Further, processing the check to pay for that purchase order runs around \$15, above and beyond the amount on the check. "If you're in a business in which every time you buy something you write a check (as opposed to summary billing), and you add that to the cost of cutting the purchase order, you realize the cost of supplies isn't tied to the product," he summarizes. "It's in the process of buying it. And that may be compounded because several departments may be ordering at once and they may be ordering daily."

His advice on stopping the cash-flow hemorrhage is basic: "You need to be stockless and maintain zero inventory." The reason, he says, is that most major dealers can deliver an order within 24 hours, eliminating the need for a backlog of inventory in your office. In fact, Tice points out, it's probably easier and faster to get your order from an outside dealer than from within your own corporate system. It's cheaper, too, because, in addition to reducing the processing costs, you're eliminating the cost of storage space, the dollars tied up in inventory and the manpower costs of stocking, unloading, and filling the orders.

Your next step should be to identify your costs by taking a survey of your current supplies ordering process. Start with the creation and printing of the requisition sheets, then follow it through placing the order, rifling the order, and paying for the goods, including every step and every cost. Tice points out that, even if you keep minimum inventory by shopping at a superstore, you will find that many costs are hidden. For example, if someone on your staff drops by the superstore on the way to work or on his lunch hour and uses the company car, your insurance costs may rise, particularly if the person has an accident. You would have to add that cost into the cost of the product. In addition, you'll need to calculate the costs associated with emergency orders, both in terms of personnel time, investment in the product, and related costs of storing that inventory.

One aspect of zero inventory to be considered is standardized products. Top-quality items, says Tice, vary little in quality or price; the main difference is in brand name recognition. Assuming this is true, and taking into account the confusion and extra efforts required by allowing end users to request specific products from the hundreds available, a plausible approach is to standardize on two or three brands of each type of product. It's likely that many catalogues will begin to feature generic products to streamline ordering and trim costs.

Another aspect of zero inventory is the risk of failure. Flaws in your system could lead to a disaster because there will be no inventory on which to depend. Tice's criteria for success with no inventory are that the system must function accurately, regularly, and as described. Once you've done your homework and you've resolved to abandon the stockroom, you have only to find the best method for your needs.

Finding your way

Your first step is to define how you want to order the supplies. Two methods of stockless supplies programs are the computerized system and the phone system.

In the former system, your supplies order is entered into your computer and downloaded to an electronic data interchange (EDI), which forwards the data to a computer mailbox. The dealer extracts the data and fills the order. Because your company is still primarily using a purchase order system in collecting the data for ordering, this method appears expensive. However, the savings come in terms of the speed with which the dealer fulfills the order, and the fact that the dealer's computer automatically proofreads your invoice before it is sent, eliminating hours of detailed reviewing.

The second method uses that desktop mainstay, the telephone. Each staff member is assigned a customer number and a catalogue from the dealer. Without having to go through purchasing, the employee finds the items in the catalogue, calls the dealer and uses the telephone keypad to enter the customer number, the item numbers and the quantity of each item. The order is placed without the purchase order paper trail, the cost of equipment, or

any investment. Large companies with several offices really benefit because orders can be placed at any time and all billing passes through central purchasing. Orders are placed as needed. An invoice is generated automatically, with every customer and every item identified for central purchasing's records.

These systems save money by eliminating central warehousing and on-site supplies space, track orders, reduce overspending and waste, and deter pilfering. Tice links the appeal of phone ordering to the need to cut personnel costs: "Your goal is to find ways to downsize (your expenses) without cutting personnel. The ideal downsizing is to transfer something you do to another party. With this system, you transfer the ordering process to the dealer from the end user. You're downloading the responsibility of storing the product, of delivering it to the desktop, and so on. With this system, we actually can deliver supplies to the desktop at less cost than the customer can do it internally."

If controlling costs is part of your corporate agenda, inventory-free supply ordering is a logical step worth considering.

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E-procurement for hospitals...

Perez, Ken

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ABSTRACT: E-procurement solutions in the healthcare market offer significant cost reduction benefits to buying organizations, primarily in terms of process cost savings as opposed to reductions in net pricing. As e-procurement solutions have been implemented by numerous organizations in various industries during the past five years, new areas of cost savings have emerged, including: reduced administrative costs; curbing off-contract purchasing; transforming the purchasing function, and; reducing errors, rework and dispute resolution costs.

TEXT: Healthcare facilities and systems save more than money using e-procurement.

According to Forrester Research, U.S. pharmaceutical and medical transaction volume processed through business-to-business e-commerce will increase from \$1 billion in 1999 to \$44 billion in 2003, representing a 136 percent compounded annual growth rate.

E-procurement solutions in the healthcare market offer significant cost reduction benefits to buying organizations, primarily in terms of process cost savings as opposed to reductions in net pricing. As e-procurement solutions have been implemented by numerous organizations in various industries during the past five years, new areas of cost savings have emerged.

Reduced Administrative Costs: Communication between buyers and suppliers is still often conducted via phone or fax, requiring manual and often double entry of order details. In fact, it's estimated that only 15 percent to 30 percent of purchases are transmitted by electronic data interchange (EDI), and that EDI's usage is concentrated with large buyers and suppliers. The average administrative cost per purchase order runs between \$75 and \$150. E-procurement can reduce administrative costs significantly, by 60 percent to as much as 95 percent. It can cut costs down to \$30, and sometimes as low as \$6 per order, a conclusion based on the experiences of numerous e-procurement customers.

Curbing Off-contract Purchasing: E-procurement can reduce so-called "maverick" or off-contract purchasing, which is sizable. A McKinsey & Co. study indicated that without e-procurement, many Brick buying accounts for roughly 40 percent of purchases, and several studies that have concluded about one third of maintenance, repair and operations spending is off-contract. E-procurement can turn the tide. According to McKinsey & Co., the implementation of e-procurement can reduce off-contract buying by 25 percent of purchases.

Transforming the Purchasing Function: Online procurement has given purchasing employees more time to spend on strategic tasks, rather than repetitious processing of order forms. Last summer, Information Week detailed the story of Visio Corp., Seattle, WA, which saved \$50,000 in one year. E-procurement had enabled its employees to spend less time in paper processing and more time negotiating cost-effective contracts with vendors.

In addition, many e-procurement solutions can capture and summarize an organization's purchasing activity, giving purchasing employees data that

can be used to understand and analyze compliance performance and conceivably, negotiate better contract terms. Finally, by shifting the workload away from repetitious administrative tasks toward strategic activities, e-procurement improves job satisfaction and employee morale. Reducing Errors, Rework and Dispute Resolution Costs: Estimates are that 25 percent of all business-to-business transactions contain pricing errors, and 30 percent is the widely cited estimate for the healthcare sector. Large hospitals report that as many as 50 percent of their orders contain errors. E-procurement solutions can help prevent pricing disputes from occurring by:

reducing or eliminating transcription errors;

reducing or eliminating data-entry errors;

facilitating online requisition approval, during which reviewers) can "catch" apparent discrepancies before the order is submitted;

maintaining buyer-specific pricing files, requiring initial review by the buyer and supplier prior to the commencement of transactions;

utilizing "price-checking" software to identify pricing errors and alert the buyer and supplier accordingly.

Although e-procurement will certainly not eliminate all pricing disputes, buying organizations can clearly and rapidly communicate and resolve order accuracy issues via the Internet.

The Bottom Line

Certainly, there are costs associated with implementing e-procurement solutions, but even the most expensive enterprise software models pay for themselves within a year. In addition, a November 1999 Deloitte Consulting survey of more than 200 business executives reported that of the heavy users of eprocurement systems, 85 percent reported being "highly satisfied" with the results.

Ken Perez is vice president of marketing for Omnicell. com.

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1998

Buying strategies

Dilger, Karen Abramic

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DOC TYPE: Journal article LANGUAGE: English LENGTH: 6 Pages

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ABSTRACT: Back in the 1960s, engineers at John Deere used a paper-based process to find, record, and assess information on standard parts. Almost 10 years ago, the giant farm equipment manufacturer upgraded to an automated, homegrown design retrieval system. The in-house system has recently been enhanced by a new component and supplier management system that turns suppliers' parts catalogs into a server-based electronic library of 3D models and technical specifications. Today, 25 users deploy DesignSuite, a stand-alone, Web-based content library and software system from InPart. Procurement and supplier management systems combine data about components, suppliers, designs, and processes in a comprehensive classification scheme to help manufacturers identify, classify, and retrieve existing information to enhance strategic sourcing. Offerings from a number of suppliers are described.

TEXT: Headnote:

Cisco Systems, 3Com use

procurement systems to gain purchasing

Headnote:

leverage, improve supplier relations

BACK IN THE 1960S, ENGINEERS at John Deere, Moline, Ill., used a paper-based process to find, record, and assess information on standard parts. Almost 10 years ago, the giant farm equipment manufacturer upgraded to an automated, homegrown design retrieval system that allowed users to conduct database searches for component data to build and purchase parts. Over the years, the company gathered enough valuable data to develop a data repository of preferred suppliers and scanned CAD drawings. The in-house system has served the company's procurement needs well, says Brian Rugh, senior engineer, but recently has been enhanced by a new component and supplier management system that turns suppliers' parts catalogs into a server-based electronic library of 3D models and technical specifications. "We can search the database by either part number or attribute to access service and replacement parts data for customers," he says. "Plus, engineers can compare, select, and download 3D models from our preferred supplier list directly into their designs. We wanted to be able to find, rather than design new parts, which is wasteful and costly." Today, 25 users deploy DesignSuite, a stand-alone, Web-based content library and software system from InPart, Saratoga, Calif. Items can be identified through a combination of hierarchical, graphical, and query-based searching functions. The solution is delivered through software and a classification methodology that allows manufacturers to work with preferred suppliers, reuse designs, and do strategic sourcing.

Stacey Lawson, an InPart vice president, explains this common problem: "If a standard bolt is listed as a different number in 10 different locations, each engineer will use the same part, but it will be assigned a different number. Therefore, they will all be sourcing the same parts instead of

reusing them or consolidating a purchase. DesignSuite brings visibility to the process, to see if volume discounts can be made for consolidation, or if near-duplicates can be substituted." John Deere plans to expand the number of system users to 100 as a part of an upcoming InPart release. Rather than accessing InPart's in-house server, the new system will allow the company to install the content database internally, giving users more control over managing content and providing service. This system uses a data repository from Parametric Technology Corp., a Waltham, Mass.-based supplier of product data and information management solutions, which recently acquired InPart. "The enterprise system will allow users to initially search our private library for data, which could include one design group or a department," says Rugh. "If nothing is there, they can broaden the search across the entire division, then to the larger Deere enterprise, and eventually to all commercially available parts." InPart focuses on such discrete manufacturing industries as automotive, aerospace, industrial equipment, and telecommunications. Its DesignSuite database currently stores information on 210,000 parts from 30 suppliers. The data-cleansing and aggregation process in which all parts and supplier data is moved to InPart's repository can take six to 12 months, says Lawson. "Since legacy data from many companies comes from various disparate systems, it is not easy to access and it is not in a searchable form." Direct vs. indirect Procurement and supplier management systems combine data about components, suppliers, designs, and processes in a comprehensive classification scheme to help manufacturers identify, classify, and retrieve existing information to enhance strategic sourcing. These systems combine use of one or more content databases and parametric search engine capability in a Web-enabled application.

AMR Research, Boston, has called the procurement management space an "enigma," but it is definitely attracting much attention. The market for these systems as a supply chain application is relatively new, partially due to the lack of key players involved and the fact that procurement is often thought of merely as back-office activities issuing purchase orders, requisitions, and approvals. Despite the puzzling aspects of this market, the systems can be split easily down distinct boundaries. Procurement management systems either involve direct or indirect purchasing, meaning they either are used for production parts, or for maintenance, repair, and operating (MRO) supplies. Direct component and supplier management (CSM) systems such as those from market leader Aspect Development, Mountain View, Calif., are decision support tools that allow manufacturers to do strategic sourcing, i.e., consolidate suppliers, compare alternative parts, reuse standard parts, and qualify for volume discounts. On the other hand, indirect procurement systems are execution-level solutions that focus on reducing or eliminating the time-consuming administrative tasks and purchasing cycle involved for MRO items. Another aspect to consider when choosing a procurement management system is the method used to aggregate parts data and where it is stored. For example, systems can support internal supplier database management for buying companies; multi-supplier database integration through an independent catalog supplier; or direct access to suppliers' Web-based catalogs. Some suppliers, such as InPart, handle the aggregation process and offer their own enhanced content catalog, managed either by the manufacturer or InPart. Users also may choose to subscribe to a subset of a third-party database repository that has been refined with a part number scheme, and information that is only applicable to the users' industry.

A unique aspect of the ItemQuest system, from CSM vendor International Computex, Atlanta, is its ability to be layered on top of existing systems, including legacy applications. This model not only allows for easier integration, but existing systems, including an enterprise resources planning (ERP) database, can be reviewed using a search to achieve thorough results. The company has established a relationship with Information Handling Services, Englewood, Colo., a content database provider focused on the electronics, governmental, aerospace, and chemical industries, but users are not restricted to a single source of content. "Companies easily

can have five different sites across the country, each with its own CAD, ERP, or legacy databases," says Jeff Osborne, a company vice president. "Many other systems require companies to extract and centralize data from their various systems and put it into a new central repository. But with ItemQuest, users still can use their legacy data-they don't have to remove it. Plus, they can search internal or external systems, various procurement solutions, or any supplier's database. The system just extracts and cleanses data on-the-fly."

Osborn says such a data aggregation project could take as long as two years because it takes a great deal of time to data-mine, cleanse, and port information to another system. Plus, parts always are described or abbreviated in different ways in various systems. A user also can do a parametric or attribute-based search for related information, such as drawings, subassemblies, documentation, and vendor source data. "Users don't have to input part numbers," says Osborne. "They can describe characteristics or technical specifications of the part they need. Typically, engineers spend 25 percent of their time searching for a part. If they can't find one, they start redesigning." He says about 80 percent of total product cost can be attributed to the first 20 percent of a product's development. "It's very important in the early phase of development to get engineers the data they need." Leverage spending Last year, 3Com Corp., Santa Clara, Calif., a global provider of network and computer communication products, implemented a CSM system to better manage commodities and suppliers across 10 divisions and cut procurement costs through strategic sourcing. The company had developed a list of 2,000 preferred suppliers prior to installing the system, but purchasing was decentralized among its various locations.

"Before using the system, sites would purchase components without knowing other sites' were buying from the same supplier," says Dan Jackson, a business development manager for Aspect Development, Mountain View, Calif., and 3Com's former manufacturing program manager. "3Com wanted a system that would give it visibility into its sites to take advantage of discounts and consolidations. Instead of buying 2,000 for one site, they could combine orders to procure 8,000 for all sites."

Before implementing Aspect Development's CSM solution, the company used a manual procurement process and Microsoft Excel spreadsheets. 3Com and Aspect developers teamed up to build custom interfaces to pull legacy data and material requirements planning (MRP) data from nearly 10 different systems at 3Com's various locations. "We built a program to migrate our MRP data to the Aspect system in a batch mode during the weekend," says Chris Loebel, a product manager for 3Com. The MRP system stores information on approved suppliers, prices, specifications, part numbers, and other details. "Although the data is not real-time, and procurement cannot do transactions from the system, it gives us the ability to research and retrieve parts information and track our purchases," says Loebel. "We have leveraged our purchasing, and the process is more centralized. Prior to using the Aspect system, we didn't know which parts and how many we sourced from which supplier. We had no way to determine how much we were spending with each supplier." 3Com has approximately 400 users, including commodity management teams and global materials staff. Phase II of the implementation focused on opening the system up to the design staff to facilitate component selection for design reuse and to cut product development time. San Francisco-based SupplyBase is an independent content database and supplier directory provider whose products can be used stand-alone to help qualify suppliers and/or parts, or used for strategic sourcing with various CSM solutions. DeveloPages at <http://www.developages.com> is an on-line directory consisting of approximately 30,000 suppliers for various manufacturing industries, including plastics molding, extrusion, fabrication, and assembly. Suppliers pay a fee for a basic listing and can pay extra if they want to take advantage of detailed profiles augmented by SupplyBase. Manufacturers can use the directory and search engine at no cost. "Instead of using a directory in print form, manufacturers can find

parts quickly on the Internet by categorizing searches by attribute," says Chris Golec, a company vice president. "When we introduced the system two years ago, it was designed to qualify suppliers and new parts, especially for custom assemblies and components. We found there were no tools to help companies identify the best suppliers based on capabilities, equipment, or certifications."

SupplyBase also is partnering with various trade publications to place industry-specific versions on the magazine's Web sites. A recent alliance was announced with Dun & Bradstreet, Murray Hill, N.J., to integrate its information services into SupplyBase's network of on-line supplier directories. "Users can get objective, accurate information about private companies performance, profits, and revenues from the Dun & Bradstreet catalog," says Golec. "We combined some of Dun's data with our directory, and about 80 percent of the suppliers in our database will be found in Dun's directory." Special reports and additional company information can be purchased on-line by users. MRO buying on-line As stated previously, indirect procurement involves maintenance, repair, and overhaul supplies, which are said to account for nearly one-third of company expenditures. Ariba Technologies, Sunnyvale, Calif., extends the definition of MRO to include other operating resources, including communications and capital equipment, computer hardware and software, travel and entertainment expenses, facilities, and services. Typically, procurement of these resources is managed through a paper-based process. However, for many companies, migrating to an Internet-based MRO solution can be considered an initial, low-risk endeavor. At Cisco Systems, San Jose, Calif., almost 40 percent of its employees, 5,000 managers, procurement personnel, financial analysts, and others use the operating resource management system (ORMS) from Ariba. The system includes search capability and workflow processes in an automated Web-based application that replaced a manual system. It has allowed the manufacturer of Internet networking equipment to reduce cycle time, eliminate data entry into its ERP procurement module, and streamline the approval process. "It used to take 13 days to create an order and receive a requisition," says Carolyn DePalmo, business process design manager for Cisco. "We plan to cut that down considerably and expect to have those results soon." The system includes embedded workflows that route approved requisitions along two paths, says DePalmo. "The route an approval takes depends on the type of item, cost, or account code. The system has a complex set of about 30 rules that dictate how requisitions flow through the management chain. If a part is standard and already priced, the requisition goes directly to the supplier. Nonstandard parts are routed to our purchasing module so a manager can review them." Managers receive e-mail alerts to signal a requisition is awaiting approval. The ORMS system is enhanced by using an electronic parts catalog compiled by Ariba and Cisco developers from 14 preferred suppliers. Since Cisco has a direct order arrangement with its high-volume suppliers, the company wanted to provide additional information to users about items they were interested in ordering. "The data is integrated into one repository, and includes a search engine that allows users to navigate through a standard tree structure," says DePalmo. "For example, they can drill down from furniture to desks, to specific sizes or features, or they can do a general search." The ORMS reporting function gives managers more control over MRO operations and business process analysis. "If procurement's job is to do strategic sourcing and consolidate suppliers, the system allows them to concentrate on their duties instead of pushing paper and running MRO transactions," says C.J. Glynn, an Ariba manager. "Errors are reduced during the approval process and duplication of effort is eliminated. The system also assets end users by giving them order status information. Managers don't have to waste time answering calls about when the order will be delivered. All they have to do is log on the Internet and check the system."

An MRO-specific parts management system also has been released from Aspect Development. The Morocco system combines the company's Explore content catalog application, and data migration and consolidation services with a

new MRO-Reference catalog of more than 1.5 million MRO items from 3,000 suppliers.

Regardless of whether procurement and supplier management solutions are used for direct or indirect purchasing, they recently have evolved beyond applications that simply streamline the purchasing cycle. Indirect procurement solutions for non-production parts can reduce administrative tasks and automate processes via the Internet. Comprehensive CSM systems combine search capability and data aggregation in a software solution that enhances strategic sourcing and allows for consolidations and volume discounts. In the long term, all these solutions will help promote better relations between manufacturers and suppliers.

Sidebar:

THIS ARTICLE DISCUSSES... the differences in functionality and results brought by direct and indirect procurement and supplier management systems. These Web-enabled applications identify, classify, and retrieve existing parts information to enhance strategic sourcing, compare alternative parts, cut procurement costs, and streamline the purchasing process.

Sidebar:

Indirect it is

Sidebar:

ERP players enter the procurement management arena with MRO initiatives

Sidebar:

The Internet has stimulated a recent growth spurt of indirect procurement management solutions, namely for maintenance, repair, and operations (MRO) supplies. Although the indirect procurement market has attracted many electronic-commerce providers, it also has prompted a few enterprise resources planning (ERP) vendors to release MRO procurement systems, as well as form partnerships with content database suppliers.

At this year's Sapphire conference, SAP America, Newtown Square, Pa., announced a business-tobusiness procurement solution designed specifically to automate purchasing MRO goods and services. The system also integrates with Mountain View, Calif.-based Aspect Development's component and supplier management solution. The SAP system includes a Webbased front end that allows users to determine pricing, availability, and delivery times from their desktops.

Says Jeff Nolan, an SAP industry segment manager, "Our solution is unique because it is end-to-end. Others offer pieces of a procurement solution, such as just being able to create electronic requisitions. The selfservice model allows users to be more productive and push less paper. Managers have more time to dedicate to working with suppliers because they have less administrative tasks."

Sidebar:

The system includes open catalog interfaces, allowing users to outsource catalogs using various scenarios. A manufacturer, for example, can support its own internal catalog, use a third-party multiple-supplier catalog or database, or directly access a supplier's Web-based catalog. "Many companies choose to access suppliers' catalogs on-line as their initial procurement application," says Nolan. "When their requirements are low, users easily can go to the Internet and move data to their desktop." Also, some manufacturers and suppliers are more comfortable with maintaining control of the database instead of turning over high-level company information to a third-party aggregator. This is how the solution works:

users access a company intranet and select a purchasing icon to create an order, which defines their requirements. They select the supplier catalog they wish to browse, building a shopping cart of office supplies. "Once the user hits save, the system automatically knows who is logged on to apply the order to a specific cost center," says Nolan. The system then performs an analysis to determine if the order requires approvals, and if so, sets workflows

Sidebar:

in motion. "The procurement system then determines if the company has any line items in stock by looking into inventory," says Nolan. "If stock is available, it will make a reservation and kick off a replenishment order." Approved purchase orders can be sent to vendors via various methods, e.g., electronic data interchange, fax, or hard copy. The system also can be customized to create a sales order on the supplier side simultaneously with the creation of the purchase order on the buyer side.

Sidebar:

According to Redwood Shores, Calif.-based Oracle Corp.'s Vance Checketts, a supply chain group manager, there are four key aspects of strategic procurement: sourcing, self-service Web solutions, process automation or electronic commerce, and architecture and infrastructure. He says traditional procurement is a production-related transaction that works directly with bills of material, while MRO purchasing is more applicable to the Internet.

Oracle's procurement system supports both local-hosted and independent catalog supplier systems. The company has a partnership with TPN Register, a Rockville, Md.-based electronic-commerce vendor that consolidates data from multiple suppliers in industrial markets for indirect procurement purposes. The company aggregates users' preferred supplier data, applies its own part number and classification scheme, and offers a subset of the total database to users. "It works like a private version of a catalog on the buyer's intranet or extranet, and it's in a searchable format," says Checketts.

Sidebar:

TPN Register also integrates with Oracle's self-service Web Req electronic requisition module, which runs through Oracle's purchasing module. "It gives the user back-end purchasing and front-end requisitioning," says Checketts. "Workflow processes are embedded into the solution, and most of our live implementations use it for indirect procurement."

By using a strategic procurement solution, users have the potential to affect bottom-line results. As much as 20 percent in procurement costs can be saved annually, says Checketts. About 3 percent can be saved on process improvement, 7 percent on volume buying, 7 percent on enforcing discounts/consolidations, and 3 percent saved on infrastructure. "One manufacturer has received a 130percent return-on-investment after one year. Another has cut order processing costs by 50 percent by eliminating a paper-based process and cutting down the approval cycle time."

Sidebar:

Ariba Technologies, at <http://www.ariba.com>, has been in business for approximately two years and has a staff of 150 employees. The company has 11 installations, including Cisco Systems, Lucent Technologies, Chevron Corp., and Visa.

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Re-engineering the acquisition and payment process - get the most from your integrated system software

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ABSTRACT: Many organizations are adopting a business process approach to managing their acquisition and payment process. Integrated information systems are an important part of this effort. This paper describes what management can expect from modern, integrated software applications, outlines major system deliverables and reports critical success factors for implementation projects. Efforts to improve organization performance by changing how the flow of work is managed have led to development of the management technique commonly known as business process reengineering (BPR). BPR entails a fundamental rethinking of all aspects of an organization and its activities.

TEXT: Kenton B. Walker: Associate Professor of Accounting, College of Business, University of Wyoming, Laramie, Wyoming, USA

Business processes and technology

Efforts to improve organizational performance (i.e., economy, efficiency, and effectiveness - the 3 Es) by changing how the flow of work is managed have led to development of the management technique commonly known as business process reengineering (BPR). BPR entails a fundamental rethinking of all aspects of an organization and its activities. Business processes are collections of activities that are managed to take inputs and create outputs valued by a customer. Process implies a strong emphasis on how work is done within an organization, in contrast to a functional focus on what is being accomplished.

One of the greatest barriers, and opportunities, to successful BPR and improved organizational efficiency and effectiveness is the way information technology is used. Old technology was designed to support a functional, command-and-control structure. Modern information technology supports new organizational relationships to improve the way work is accomplished. New technology permits organizations to focus on products, customers, and the flow of work across functional boundaries - their business processes. Consistent with the BPR philosophy, management in many organizations is selecting integrated software solutions to implement BPR outcomes. In addition, managers are adopting a business process approach to management in order to make the organizational changes necessary to realize 3E benefits available in integrated information systems.

Technology and the acquisition and payment process

A prime example of the application of information technology to facilitate process management and the 3Es is in the acquisition and payment process. This process includes the activities within accounts payable (AP), purchasing (P), and inventory management (IM), each a sub-process of the acquisition and payment process. A diagram of this collection of activities is shown in Figure 1. Many financial systems now provide fully integrated, economical system software to support management decision making for the acquisition and payment process. However, management may achieve this objective only by rethinking how the activities in this process should be managed and configuring the information system to support the process.

The strategy of most companies concerning the acquisition and payment process is to have the right quantity and quality of materials in the right place, at the right time, and for the right price. The purchasing system is useful for documenting material requisitions, selecting vendors, and determining price. Accounts payable serves to pay for purchases. For organizations that produce a wide variety of products at multiple locations, inventory management systems are employed to help with materials management activities. These systems all provide financial information to help management achieve its goals for earnings and return on investment.

A process includes the total flow of information across organizational boundaries. In the past, only separate information systems were available to support activities within AP, P, and IM. These piecemeal systems bridge manufacturing, finance, purchasing, and engineering to provide basic information about committed expenditures, inventory cost and expense, and basic manufacturing costs. However, these systems result in duplicate databases, inconsistent reports, and unreliable information. Separate systems require extensive reconciliations and time for batch processing in order to report information. Users are frustrated by the need to audit, reconcile, and generally validate data. As a result, management must build time into the process of ordering and acquiring goods to allow for the inevitable errors and subsequent corrections. Users of the information from these systems often find it difficult to make timely and accurate decisions. The systems are not economical or efficient.

The objective of integrated systems is to minimize data input, ensure consistency and reliability of data, and provide flexible tools for analyzing data so that appropriate decisions can be made and evaluated. Automating functions is only one step in that strategy. The key to ensuring success of an integrated system is to provide users access to as much reliable company data as they need to perform their jobs. Integrated systems are more economical than separate systems because only one application software product is employed. They are more efficient with respect to data entry and storage because data is only entered once. Finally, integrated systems are more effective than separate systems because they free up employees to spend more time providing their customers with the analyses and input they need.

Major deliverables of an integrated system

Table I outlines basic steps for implementing an integrated AP/P/IM system.

Traditionally, data from AP, P, and IM is transferred to the general ledger and becomes part of the overall financial reporting of the company. However, integrating these systems allows for more than just transaction processing. The basic master files created to support AP/P/IM activities also are important to other systems such as plant maintenance, manufacturing MRP, freight, hazardous materials, project materials, marketing materials, and other similar systems. Following are major deliverables by sub-process for a project to implement an integrated AP/P/IM system.

Accounts payable

Table II outlines key activities in AP that management should evaluate for improvement when a new system is being implemented. Integrated systems provide at least four benefits over separate AP systems. The first benefit is the ability to process payments using either 2-way or 3-way matched documents. Standard invoice vouchering requires a matching of values (units and dollars) between a purchase order, receiver, and an invoice. This procedure meets certain GAAP (generally accepted accounting principles) requirements to control the purchasing process and prevent system abuse and collusion. Within certain high volume contracts, a company may elect to pay

on receipt of material rather than receipt of an invoice and use pre-established prices to determine the value of the goods received. In these instances the supplier will not submit invoices for payment but will be paid upon receipt of goods within the previously established terms. This practice eliminates incoming mail and accompanying processing requirements, reduces time spent on retrieving and matching documents, eliminates invoice errors and correction processes, and improves supplier relations by allowing for prompt payment for goods and services.

Secondly, the AP system should process payments electronically through several different types of electronic media. The use of electronic funds transfers (EFT) and electronic data interchange (EDI) permit processing of payments in an expedient manner. This means that management can retain funds until they are due and maximize investment earnings. This also allows the firm to make payments on a timely basis so that the company can take advantage of earned discounts. The use of electronic media between a company and its suppliers also reduces the flow of paper into the company and eliminates the handling and processing costs associated with movement of paper documents. Using electronic payment methods encourages suppliers to offer cash discounts with the assurance that funds will be transmitted when due. The improved supplier relations also set the stage for additional cost reductions due to elimination of administrative activities on the supplier's part.

Thirdly, the system should provide management with the ability to manage current and projected cash needs. Systems with the capability to integrate purchasing and inventory activities with projects, plant maintenance, and manufacturing permit analysis of cash requirements and include reports on special commitments such as down payments and prepayments. The AP cash needs reporting combined with other financial inputs allows management to plan for and make decisions concerning cash flow issues.

Finally, AP must provide certain compliance reports based on actual payments made. These reports include 1099s, taxes paid to various taxing entities, and withholding that occurred throughout the year. In some cases, AP must withhold a percentage of payments to vendors and report that amount to the IRS on a regular basis. The flexibility of the system combined with the depth of the database allows for automated withholding to take place and generate reports promptly and accurately, consistent with regulatory requirements.

Purchasing

The purchasing system processes, records, and reports the expenditure of funds for the acquisition of materials and services. In many organizations tens or hundreds of thousands of purchase orders are issued annually. In addition to providing the purchasing function employees with the means to carry out their responsibilities, this system also provides on-line information for other users in manufacturing, project, and maintenance concerning material status, availability, pricing, costing, and vendor performance data. Integrating this system with AP and IM systems allows current and consistent data to be viewed by all users and presents many opportunities to improve the performance of the acquisition and payment process. Table III outlines several purchasing activities that management should evaluate for improvement when an integrated system is being implemented.

A modern, integrated purchasing system should provide at least six important features. The first feature is an automated, paperless acquisition system. The purchase requisition is the initial document used to initiate the purchasing activity. Requisitions generally route documents to purchasing for action through the interoffice mail system. Sometimes requisitions must be routed to personnel in other departments for review and approval. This routing increases the lead-time required to acquire the

material. An electronic, paperless system can reduce this lead-time and reduce safety stock needed to cover the time spent in routing paperwork. In addition, the requisition system requires files and filing, replies to be rerouted, and approval documents matched with initial requisitions. Electronically, this can all happen faster, with less effort, and with improved efficiency.

A second feature of a modern integrated purchasing system is unlimited query and drill-down capability. The chief concern of requisitioners is the status of their materials. New systems provide users with integrated look-up capabilities combined with drill-down features that allow for viewing details at the source document level. This operation, performed in an integrated environment, replaces the need to log on and off of different systems to find all the information needed to answer an inquiry. This feature also saves time and improves decision making because all the information is easily accessible.

Third, new systems help automate replenishment of inventory. Using a minimum/maximum inventory system together with a replenishment formula, EDI, and blanket orders, the system can generate inventory requirements and communicate those requirements to the supplier automatically.

Fourth, recording and managing contracts requires different system attributes than does the management of purchase orders. Contracts generally extend beyond one year, have payment schedules, involve complex deliverables but do not have the standard receiver to trigger payment or completion of the contract. In order for a purchasing system to be effective, it must be able to provide the tools necessary for active and accurate contract management.

Fifth, a system must be able to capture and report accruals using business rules for budget and tax reporting. This feature permits fast and accurate accounting of department expenditures and financial commitments as well as faster closing of the books at period or year-end.

Finally, poor supplier performance costs money. Errors in shipping, packaging, billing, and labeling all result in man-hours to research and correct problems. In addition costly downtime may result if a critical item does not arrive on time. Managing suppliers requires a system to measure supplier performance across a broad spectrum of metrics. New systems permit good suppliers to be rewarded and corrective action against suppliers with performance below acceptable levels. Data on supplier performance provides management with information to explore mutual cost saving opportunities.

Inventory management

Many companies maintain hundreds of thousands of items in inventory and valued at millions of dollars. If a company can reduce inventory, it may represent a substantial cost saving to the company. Also, management should review and evaluate IM activities for improvement when implementing an integrated system. Some of these IM activities are listed in Table IV.

Three important deliverables of an integrated AP/P/IM system are expanded usage of EDI, the ability to track materials throughout the system, and more accurate inventory valuation. The inventory master file is the primary record of usage history, pricing, and vendor performance. The item master file is the primary tool for implementing blanket purchase orders and using EDI to automate replenishment of inventories. EDI uses a combination of the vendor master, item master, and blanket purchase orders to execute transactions. This feature permits management to automate a high percentage of inventory transactions.

Materials often reside in several temporary locations outside of the storeroom. A modern system can track and trace materials being inspected,

in transit, staged for use, and in other locations. Accurate tracking of materials prevents duplicate ordering, saves money in handling and tracking costs, and ensures that material is available where needed.

Inventory can be valued using several different methods but the accounting needs to be consistent so that inventory shrinkage is not reported merely because of calculation changes and errors. Many organizations write off thousands of dollars related to inventory annually because of calculation and transaction errors. New systems maintain accurate balances reducing the likelihood of write-offs.

Critical success factors for the acquisition and payment process system implementation

The AP/P/IM systems are primarily transaction-based systems. They must always be in balance to provide the following: 1) accurate and current cash information, 2) information about purchase commitments, 3) material status for users, 4) record and report expenditures throughout the organization, 5) documentation of buyer and supplier performance, and 6) accurate and current inventory position.

Integrated AP/P/IM systems provide real-time, accurate transactions and support the 3Es. If users can access the information on-line, department managers can make effective decisions and develop strategies to support business process objectives. Following are a number of critical success factors that will ensure management and users are satisfied with their integrated AP/P/IM system. These critical success factors are designed to reinforce the benefits and opportunities of a good acquisition and payment process.

Provide system integration

True system integration is achieved when software applications are efficient and use one common database. Therefore, the rest of the system will know when one element of a master file is changed. Integration also ensures that updated dynamic data (transactions) are available and visible throughout the system. Single master files reduce the number of updates. The information is accurate and timely for all views. Data do not have to be copied into another system. In addition, users do not need to reconcile between sub-ledger accounts and transaction details because the account balances are built directly from the transaction data. Users can be confident that they have access to source data to assist them in formulating strategies and make better-informed decisions.

Provide on-line look-up capabilities for decision making

Today's work environment requires that information systems provide a wide array of information for efficient, effective decision-making purposes. Information systems previously provided customers with information on a functional or departmental basis only. However, new systems allow anyone with proper authorization to access, view, and manipulate data and create reports as necessary for them to perform their duties. The benefit of new technology is that users will become independent of information technology when making routing inquiries. An integrated system provides access to needed information at the user level for anyone making a decision and taking further action. Employee productivity will improve because system users requiring material and payment status will not depend on phone calls. Management can measure the benefits of fewer printed reports and increases in user productivity.

Improve productivity through electronic document transfer

The use of electronic document transfer (EDT) will speed up many transaction-related activities providing greater economy and efficiency. Documents can be sent and received electronically, saving time and

eliminating re-keying redundant data. Management should support the use of electronic data interchange (EDI) for ordering routine materials and expand the number of trading partners using this tool. Management should also encourage use of EDI as a vehicle for the receipt of invoices from suppliers. Expect to increase the use of electronic funds transfers thereby eliminating invoice matching, vouchering, and check writing practices. Some benefits of electronic document transmission include improved communications, fewer time delays from the physical routing of documents and speeding the overall processing of daily transactions. Some measures of the success of EDT are improved employee productivity, reduced clerical support, and more efficient processes.

Provide regular and programmatic monitoring of supplier performance

Management should reward good suppliers with increased levels of business and curtail business with poor performers. An integrated system will permit managers to collect data on supplier performance across a wide array of performance parameters. Poor supplier performance costs the company money in the form of shipping, packing, and billing errors that must be researched and corrected. By collecting performance data and monitoring supplier performance, management can implement specific programmes to improve supplier performance and limit or eliminate business with poor performing suppliers. Management can analyze performance data and set standards for acceptable supplier performance.

Facilitate inventory reduction through improved reporting and analysis

Inventory levels are set using a combination of formulas, usage history, and general maintenance experience. Improved tracking and reporting of inventory activity and purchasing status combined with the availability of information about inventory may provide the impetus to manage inventories differently. Improved inventory reporting combined with increased credibility in the system will support inventory reduction programs (economy) and may result in reduced stocking levels of several classes of inventory. Also, new strategies for inventory management can be developed using the better information. Inventory levels can be analyzed at system implementation and at selected periods of time thereafter. Inventory reductions improve cash position plus eliminate any overhead attached to inventory carrying costs.

Improve efficiency of transactions

Much of the AP/P/IM systems are transaction oriented. Many existing systems do not have on-line edits or batch edits, allowing invalid transactions to be processed. The errors are generally discovered through the printing of exception reports after the processing is completed. Period-end processing includes substantial time devoted to correcting errors. A new system should provide on-line and batch editing and prevent invalid transactions. Having all transactions in balance at the time of entry will eliminate error reports and correction activities. Eliminating errors also supports data integrity and improves reliance on the system for accurate information. Many man-hours will be saved company-wide in both report auditing and error correction activities.

Conclusion

The bottom line for organizations that adopt integrated acquisition and payment process systems and make the organizational changes necessary to realize the objectives of these systems is higher profits. Higher profits are achieved through a combination of economy (lower costs), efficiency (improved workflows) and effectiveness (better decisions resulting in satisfied customers). Information is a source of competitive advantage as are the systems that are used to provide the information.

Caption: Figure 1; Overview of the AP/P/IM system; Table I; Steps for implementing an integrated AP/P/IM system; Table II; Key activities to be

evaluated for improving accounts payable; Table III; Key activities to be
evaluated for improving purchasing; Table IV; Key activities to be
evaluated for improving inventory management

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World-Class Procurement Systems: Priority Target for Success

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If your enterprise integration program is to command the attention and support of top management, it must include very big opportunities for cost reduction and performance improvement. For maximum visibility and effect, these opportunities should span plants, divisions, and countries. And they must showcase the value of systems integration.

For subscribers in large, diverse, and multinational companies, we believe that improving your procurement function will be a better opportunity than most. In spite of significant progress over the past decade, procurement systems remain an important area for improvement in most companies today.

At the enterprise level, the procurement function includes the following front-end processes:

- Supplier selection and contracting -- qualifying and certifying suppliers; bidding and contracting for price, terms, and conditions;

- Requisitioning, buying, and releasing -- against contracts or authorized buying agreements; includes scheduling, requesting, approving, ordering, and routing.

Back-end processes include:

- Receiving and stocking -- receiving, acknowledging, inspecting (if needed), delivery to point of use (or storage), and authorization to pay;

- Payment and evaluation -- matching (if needed), invoicing, adjustments, and disbursements; also maintenance of audit trails and supplier performance ratings.

Best Practices

World-class manufacturers have steadily transformed their procurement philosophies and systems technology. Our research suggests that the following are best practices today, in front-end processes and activities:

- Significant reduction in the number of suppliers;

- Longer-term commitment to preferred suppliers;

- Standard, company-wide commodity codes;

- Pooled or lead buying of key commodities;

- Paperless processes;

- "Buyerless buying" -- empowering requisitioners to order without intervention.

On the back end, best practices include:

- Electronic links with suppliers and transporters;

- Supplier certification, to bypass receiving inspection;

- Empowered receiving, to authorize payment without the need for three-way matching of orders, receipts, and invoices;

- Automatic payment upon use;

- Complete audit trails.

Supplier reduction and partnering, lead buying, and commodity codes are bedrock policy improvements. They are also 1980s thinking (meaning there is little, if any, competitive advantage here). We operate on the assumption that most of our subscribers are already implementing these policies in day-to-day operations. But we also know that many of you are limited in moving beyond these basics by inadequate information systems and lack of integration.

Best-practice companies have overcome this limitation. Electronics firms -- IBM, Hewlett-Packard, and Texas Instruments, to name three -- are especially good with front-end improvements and systems. The complex nature of their buying, and their high materials costs, have been driving forces.

On the back end, the automotive companies stand out. Ford, Chrysler, and Saturn are all driven by repetitive, high-volume operations, and the need to reduce inventory and clerical costs. Both groups of companies excel at electronic data interchange.

Nobody Does It Better...

Among multinational manufacturers, we have found none better than Texas Instruments (TI) in its front-end procurement processes: contracting, requisitioning, approvals, and ordering. TI's story is of special interest because the company is now selling its enabling information systems through a recently formed Enterprise Systems Division. Several large companies, both within and outside the electronics industry, are shopping TI's software, and at least one global manufacturer is installing it now. We will examine TI's commercial offering -- Integrated Procurement Management System (IPMS) -- in a subsequent issue. This month, we want to share the TI journey, and its lessons for successful enterprise integration. These lessons are instructive, with or without the TI software.

Procurement 2000: Continuous Improvement in Action

With revenues of almost \$7 billion, TI buys roughly \$3.8 billion of materials annually. At better than 50% of revenue, even a small reduction in costs through volume buying can have a solid impact on bottom-line profit. Under relentless cost and profit pressure during the early 1980s, TI's senior management decided to give special attention to procurement processes and materials costs. In 1984, the company commissioned its Procurement 2000 program.

The program's mission is to "provide TI a competitive advantage through a world-class process which produces lowest total cost of ownership for all goods and services acquired." TI's program goals include:

- Consolidating volumes worldwide;
- Reducing the number of suppliers;
- Improving supplier quality;
- Reducing materials acquisition time;
- Lowering materials costs;
- Basing sourcing decisions on total cost of ownership, including transaction costs with suppliers, reliability, quality, etc.

These goals were not entirely new in 1984. Continuous improvements in procurement processes and systems date from 1969, when TI installed its first computer-based purchasing system. We have summarized the evolution of TI's systems and capabilities in the Benchmark Chart (on page 4 of the printed version of this issue, available from Cutter Information Corp.; (800) 888-8939 or (617) 648-8707). The chronology provided gives you a good way to measure your company against Texas Instruments.

World-Class Features and Functions

A diagram of TI's current procurement system appears in Figure 1 (see printed version of this issue, available from Cutter Information Corp.; (800) 888-8939 or (617) 648-8707). The system is available from any of the company's 75,000 terminals or 46,000 personal computers, worldwide. It is also available by modem to traveling employees and several thousand authorized suppliers. The latter are given the necessary software -- and even hardware -- at no charge.

A single supplier database contains all authorized suppliers, anywhere in the world. No purchase can be made from an unauthorized source. Procurement staff can authorize new suppliers in hours, if needed, anywhere in the world. This speed keeps central sourcing from becoming the bureaucratic bottleneck that it is in so many large companies today.

A single commodity database contains codes for every item that Texas Instruments buys, worldwide. No item may be bought without assigning the correct code. Edit checks assure correctness and completeness. The commodity code automatically marries every request to any contract or purchasing agreement in force. Part numbers are separate. They need not be standardized across divisions or product lines.

A single agreements database contains all supplier contracts, all over the world. TI calls them option agreements. These lock in prices, terms, and conditions for given volumes purchased. Once established in any location, for any division or site, option agreements are available

worldwide for the commodities they include.

Electronic, paperless requisitions are provided by what TI calls EZREQ. And easy it is. Over 4,000 personnel are authorized to requisition materials. None use paper. EZREQ prompts the user for necessary information and matches requested commodities to option agreements in force. Automatic requisitions from MRP can be provided directly to suppliers, with or without intervention.

Electronic routing and approval (ERA for short) is perhaps the most powerful aspect of TI's entire procurement system. If requisitioners are authorized, they issue purchase orders directly. The appropriate buyers are informed, but do not intervene. TI calls this the "express train." More than 60% of purchase orders move in this manner today (see Figure 2 in the printed version of this issue, available from Cutter Information Corp.; (800) 888-8939 or (617) 648-8707).

The "city train" is used when approvals are required by department supervisors or buyers. ERA routes the requisition directly to the required reviewers, and notifies them via electronic mail that the document is waiting. Several levels of approval may be structured in this manner. Supervisors or buyers may delegate approval rights in their absence, or review requisitions while away via modem and laptop computer -- say, from a hotel room. If everything is in order, approval is given by function key, and the request moves automatically to the designated supplier. Problem requests may be returned to the original requisitioner with notes and an E-mail alert.

Buyer workstations give buyers worldwide visibility of commodities purchased in their domains. These stations also provide the tools needed to set up new suppliers, commodities, and agreements. Through the workstation, a buyer can intervene and adjust various procedures. If delivery problems occur between a supplier and a specific location, a buyer can disable that supplier link, and turn on an alternate.

Direct supplier access is provided to authorized vendors. Suppliers can review forecasts and requisitions in a dial-up transaction. Confirmations are returned to TI, and TI returns a purchase order number to the supplier. This number is simultaneously posted to all appropriate parties and processes within TI. In a recent demonstration via 2400 baud modem, the entire review and order cycle took less than five minutes, including all log-ons and -offs. Screen response at midday (US) was about one second.

Audit trails are provided by time and date stamp on every transaction. These can be reviewed online, in summary or detail.

Electronic data interchange is a key element of TI's communications with suppliers and transportation companies. The time to establish an electronic link with a new supplier or transport provider can be less than a day.

Benefits of Integrated Procurement Systems

According to Henry Weissenborn, a spokesperson for TI's Enterprise Systems Division, "Today, we can document savings of more than \$30 million a year, and that's a conservative estimate." Part of these savings come from buying smarter, now that buyers have more time to plan and negotiate, and a worldwide view of requirements. Weissenborn reports that "in the past, our buyers were spending 80% of their time working on internal problems to get an order qualified, clarified, configured, and placed. The other 20% was spent managing suppliers and negotiating agreements. That has reversed."

Reduced cycle time is another major benefit, worth millions of dollars. In many companies, requisitions and orders are stuck for days waiting on missing or corrected information, or simply for overworked buyers to review and release them. At TI, no document can move to the next step without complete and correct information. Such information quality, along with automatic approval and transmission, has slashed average processing time from 20 days to 4 days on recurring purchases. As any manufacturing manager knows, that 16-day reduction translates directly into inventory lead time reduction. Questions: How long is your procurement processing cycle? How much inventory could you eliminate if that cycle were

cut by 75%? TI gets a double dip because better supplier communications improves on-time delivery. So the company can reduce safety stocks in proportion to the reduction in lead time variability.

Like all world-class manufacturers, TI keeps lots of measurements on its continuous improvement programs. Figure 3 shows four of these measurements for Procurement 2000 (see printed version of this issue, available from Cutter Information Corp.; (800) 888-8939 or (617) 648-8707).

Participatory Systems Development

TI's management attributes the success of Procurement 2000 to the following factors:

- A clear mission statement, provided by senior executives;
- System requirements defined by purchasing and materials managers;
- Each business entity represented during systems design;
- Key suppliers participating in Joint Application Design (JAD) sessions;
- Monthly reviews by each business unit of user team progress and its own representative's contributions;
- Extensive training and education for all affected personnel and suppliers;
- System results (like those in Figure 3) widely communicated through a comprehensive reporting and measurement package.

Integrate, Automate, Simplify

We have long believed that systems integration and automation are simplification. To see them as lesser, or separate, sequential steps is to miss their enabling and breakthrough effects. As shown in Figure 4 (see printed version of this issue, available from Cutter Information Corp.; (800) 888- 8939 or (617) 648-8707), TI puts information technology where it should be in the 1990s and beyond -- at the front of the improvement process. We could not agree more. TI purchases over 5,000 line items daily. Over 3,300 move without paper to thousands of suppliers. That's two per minute, worldwide, 24 hours a day. We can't think of a simple way to do that without automation and integration.

Message: Warm and fuzzy gestures toward supplier partnerships -- even formal certification programs and ratings -- will bring no great advantage without concurrent systems integration and support.

As an aside, we estimate that TI has over 3 logical units per employee in its 130 local area nets and largely integrated global systems. Our estimate includes terminals, personal computers, peripherals, and automated production equipment. What is the ratio in your company?

What About Systems Architecture?

TI is well-known as an IBM mainframe shop. Virtually every aspect of TI's procurement systems has evolved in the IMS and DB2 computing environments. The notable exception is the buyer work-station, which uses OS/2 in a cooperative processing arrangement. Data are pulled from the mainframe for specific tasks, and returned to the appropriate central database.

Do you need a mainframe and DB2 to emulate TI's accomplishments? Probably not today. At the time TI developed its capabilities, the task would have been much harder and the results less certain in a mixed computing environment. But today, a company could duplicate TI's capabilities with a variety of interoperable tools and techniques. Response times and uptimes might be reduced, but "from scratch" development costs would be lower, too.

TI sees a long-term role for its mainframes. Nevertheless, it has been consolidating rapidly, from 36 computing centers in the late 1980s to only 5 today, and the company plans to have even fewer in the near future. TI's systems architects anticipate expanded roles for desktop and portable end-user computing, and for peer-to-peer networked applications, in place of traditional, hierarchical approaches.

Mainframe bashers take note. Seeing TI's procurement system in action inspires respect for centralized computing. Access and response times are a second or two, worldwide, and less than a second on many transactions. Uptime is virtually 100%. Communications networks are redundant, with satellite, T-1, and fiber-optic links. Observant users can detect slight

degradation when switched to slower media, but with a requisition-to-order cycle that can be as short as minutes, this is a nice problem to have.

Next Month

We will look next month at TI's extended enterprise, and its integration with suppliers and customers via electronic data interchange.

We also plan a followup on the commercial version of TI's procurement system. If you can't wait, contact: Mr. Dan Manack, Enterprise Systems, Texas Instruments, P.O. Box 869305, Plano, TX 75086 USA; (214) 575-2000.

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S2	5462126	REVIEW?
S3	14403928	APPROV? OR ENDORS? OR SUPPORT?
S4	1105157	DEADLINE OR (LAST (5N) TIME) OR (LATEST (5N) TIME)
S5	300	S1 (S) S2 (S) S3
S6	8594	(APPROV? OR SUPPORT? OR ENDORS?) (10N) (SEQUENCE OR SEQUENT OR SEQUENTIALLY)
S7	7	S5 AND S4
S8	0	S5 AND S6
S9	16	S1 AND S2 AND S6 — 6
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